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AUTHORITY

31 Mar 1965, DoDD 5200.10; NSWC ltr dtd 26 apr 1976

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FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION ALEXANDRIA, VIRGINIA

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SECURITY INFORMATION

U. S. NAVAL PROVING GROUND DAHLGREN, VIRGINIA

REPORT 110. 1108

BOMB FUZING SYSTEM;

RESEARCH, DEVELOPMENT, TESTS AND REPORTS OF

Partial Report 42nd

> ROCKET LAUNCHER TESTS OF ELECTRIC BOMB FUZE EX 200 MOD 3

> > Task

Assignment NPG-Re2b-20-1-53

Classification <u>CONFIDENTIAL</u> SECURITY INFORMATION

FINAL Report

Copy No. ____6_

Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

PART A

SYNOPSIS

- 1. The last tests of the EX-200 Mod 3 fuze on the Naval Proving Ground's 1050 ft. launcher produced the following results:
- a. Fuzes with 35G trigger switches had functioned on targets as light as 1/16" mild steel.
- b. The C-R-C circuits had been satisfactorily modified so that they would withstand heavy impacts.
- c. Faulty pyrotechnic actuators caused five (5) arming failures out of the eleven (11) rounds fired against heavy targets.
- d. One (1) fuze out of 14 tested failed to function because the S3 switch was held down by extraneous material forced into the charging plug cavity during target penetration.
- 2. This test was conducted to obtain additional data on the functional ability of these fuzes to arm and fire after heavy plate impact.
- 3. It is concluded that:
- a. An appreciable percentage of arming failures may be anticipated with the EX-200 Mod 3 fuze (10% in each of the last two (2) tests) during heavy impacts if the S3 switch is not changed in design. While penetrating heavy targets, foreign material tends to lodge in the top of the fuze, holding the S3 switch closed and preventing the arming cycle from being completed.
- b. Many delayed fuze actions are resulting in duds (5 out of 9 fuzes that had completed their arming cycle in the present test) because of faulty pyrotechnic elements.
- c. Four (4) of the nine (9) fuzes completing their arming cycle, in the present test against 3/4" and 1" STS armor plate, fired the ll second delay primer satisfactorily and probably would have produced high order detonations if they had been in explosive loaded bombs with live boosters.

CONFIDENTIAL NPG REPORT NO. 1108

Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

4. It is recommended that steps be taken to remedy the deficiencies noted in the conclusions of this report before the start of evaluation tests by providing for more reliable pyrotechnic elements and either relocating or redesigning the S3 switch. The present tests mark the end of the development tests of the EX-200 Mod 3 electric bomb fuze.

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NPG REPORT NO. 1108

Rocket Launcher Tests of Electric Bomb Fuze EM-200 Mod 3

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NPG REPORT NO. 1108

CONFIDENTIAL

Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

PART B

INTRODUCTION

1. AUTHORITY:

This test was conducted in accordance with references (a) and (b) under Task Assignment NPG-Re2b-20-1-53, reference (c).

2. REFERENCLS:

- a. NOL Conf ltr NP/NOL/X1-1(1258)WA: NCB: gbh Ser 01811 of 9 Oct 1951
- b. NOL Conf Work Request FA-43 of 8 Sen 1952
- c. BUORD Conf NP9 Re2b-DBLar: bjn Ser 42733 of 29 Jul 1952
- d. MPG Conf Report No. 1048 of 8 Sep 1952

3. BACKGROUND:

The last tests of the EX-200 Mod 3 fuze on the Naval Proving Ground 1050 ft. launcher, reported in reference (d), had produced the following results:

- a. Fuzes with 35G tripger switches had functioned on targets as light as 1/16" mild steel.
- b. The C-R-C circuits had been satisfactorily modified so that they would withstand heavy impacts.
- c. Faulty pyrotechinc actuators caused five (5) arming failures out of the eleven (11) rounds fired against heavy targets.
- d. One (1) fuze out of 14 tested failed to function because the S3 switch was held down by extraneous material forced into the charging plug cavity during target penetration.

4. OBJECT OF TEST:

This test was conducted to obtain additional data on the functional ability of these fuzes to arm and fire after heavy plate impact.

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Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

5. PERIOD OF TEST:

a.	Date Project Letter	8 Sep 1952
b.	Date Necessary Laterial Received	1 Oct 1952
c.	Date Commenced Test	22 Oct 1952
d.	Date Test Completed	29 Oct 1952
0.	Preliminary Report Submitted	25 Nov 1952

6. REPRUSENTATIVES PRESENT:

Mr. N. C. Butler	Naval Ordnance Laboratory
Mr. R. V. Hall	Naval Ordnance Laboratory
Mr. D. K. Tower	Daystrom Electric Corp.

PART C

DETAILS OF TEST

7. DESCRIPTION OF ITEM UNDER TEST:

a. Drawings and a description of the modifications in and operation of the fuzes tested are found in reference (d). All fuzes in the present test had 1000 G impact switches to insure non-functioning on the launcher. The only explosives in the fuzes were the arming squibs, primers and detonators. The primers differed from those previously used in that they had a glass plug to supply a hermetic seal. All fuzes were filled with freon gas to a slight positive pressure.

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Rocket Launcher Tests of Electric Bomb Fuze LM-200 Mod 3

8. DESCRIPTION OF TEST EQUIPMENT:

Test Vehicles:

250 lb. G.P. Bombs AN-M57A1 Vermiculite Cement loaded, with cross-axial fuze liner midway.

Propelling Force of Test Vehicles:

Three (3) 500 rocket motors Mk 2 Mod 3 mounted in special carriage.

Launcher:

NPG 500 ft.

Fuze Charging Equipment: Daystrom Electric Corp.

Targets:

3/4" and 1.0 STS armor plate.

Velocity Measurements: Counter chronograph and oscillograph.

Cameras:

35mm Mitchell and Bowen Acceleration.

9. PROCEDURE:

a. The fuzes were inserted in the fuze cavity after the bomb had been placed on the launcher in firing position. The fuze was then electrically tested and a charging potential of 200-210 volts D.C. applied to the fuze condenser immediately before the round was fired. The three (3) propulsion motors secured to the bomb were ignited simultaneously. The first two (2) rounds were fired against 1.0 STS armor plate but the impact was so severe that the bombs deformed badly and broke open. The remaining rounds were fired against 3/4" STS plate. All the bombs were recovered from these impacts in good condition. The fuzes were removed from the bombs at the recovery site, given a partial examination and then returned to the Naval Ordnance Laboratory for a complete breakdown.

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Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

10. RESULTS OF TEST:

- a. Tabulated test results are found in Table I. Detailed impact records are found in Appendix (B).
 - b. Following is a summary of the test results:

No. of Rounds	STS Target	Striking Velocity ft./sec.	Fuze Arming	Action Functioning
2	140	1100	1 Complete 1 Incomplete	l Complete l Did not fire
8	0475	1090	8 Complete	3 Complete 5 Did not fire

c. Only one (1) of the ten (10) fuzes fired failed to arm completely after target impact. In that instance the switch S3 was held down by metal broken from the top of the fuze. In the previous heavy impact test one (1) of ten (10) fuzes failed to arm because the S3 switch was held down by extraneous material. Five (5) fuzes were duds, even though they armed completely, because the 11 second primer actuated without igniting the delay column. Four (4) fuzes functioned completely, including proper firing of the 11 second delay primers.

PART D

<u>CONCLUSIONS</u>

11. It is concluded that:

a. An appreciable percentage of arming failures may be anticipated with the EX-200 Mod 3 fuze (10% in each of the last two (2) tests) during heavy impacts if the S3 switch is not changed in design. While penetrating heavy targets foreign material tends to lodge in the top of the fuze, holding the S3 switch closed and preventing the arming cycle from being completed.

Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

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NPG REPORT NO. 1108

Rocket Launcher Tests of Electric Bomb Fuze EM-200 Mod 3

- b. Many delayed fuze actions are resulting in duds (5 out of 9 fuzes that had completed their arming cycle in the present test) because of faulty pyrotechnic elements.
- c. Four (4) of the nine (9) fuzes completing their arming cycle, in the present test against 3/4" and 1" STS armor plate, fired the ll second delay primer satisfactorily and probably would have produced high order detonations if they had been in explosive loaded bombs with live boosters.

PART E

RECOMMENDATIONS

12. It is recommended that steps be taken to remedy the deficiencies noted in the conclusions of this report before the start of evaluation tests by providing for more reliable pyrotechnic elements and either relocating or redesigning the S3 switch. The present tests mark the end of the development tests of the EX 200 Mod 3 electric bomb fuze.

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Rocket Launcher Tests of Electric Bomb Fuzo EX-200 Mod 3

The tests upon which this report is based were conducted by:
F. W. KASDORF, Rocket Batter Officer
Rocket Battery
Terminal Ballistics Department

This report was prepared by:
F. W. KASDORF, Rocket Battery Officer
Rocket Battery
Terminal Ballistics Department

This report was reviewed by:
R. H. LYDDANE, Director of Research
Terminal Ballistics Department
W. B. ROBERTSON, Lieutenant Commander, USN
Terminal Ballistics Officer

C. C. BRAMBLE, Director of Research, Ordnance Group

Terminal Ballistics Department

APPROVED: J. F. BYRNE

Captain, USN

Commander, Naval Proving Ground

E. A. RUCKMER

Mechner

Captain, USN

Ordnance Officer

By direction



NPG REPORT NO. 1108

U. S. NAVAL PROVING CROUND DAHLGREN, VIRGINIA

Forty Second Partial Report

on

Bomb Fuzing System;

Research, Development, Tests and Reports of

Final Report

on

Rocket Launcher Tests of Electric Bomb Fuze EX-200 Mod 3

Project No.: NPG-Re2b-20-1-53 Copy No.: 6 No. of Pages: 9

Date: MAR 2 0 1953

CONFIDENTIAL

NP9-62254

Heavy Flate Impact Test of EX-200 Med 3 Bomb Puze (Arming After Impact)

Mig. - Carnegle

TABLE I

NO. 043792 (1:00 Flats - 0775 and 1800 ST. COPPIDENTIAL

250# G.F. Bombs

Inert Loaded with Cement Sired from FPG 500 ft. Launcher

Promulsion supplied by three 500 HVAR rocket motors in a special carriage

Funct. Completely
Did not Furct. Completely
Funct. Completely
Funct. Completely
Armed but did not fire
Armed but did not fire Punct. OK 17" x 23-1/2" 26" x 32" 16-1/2" x 17" 12" x 18" 10" x 29-1/2" 12" x 14" 13-1/2" x 19" 13-1/2" x 19" Through Opening 24" x 28" Pane-tration Comp. Comp. Comp. Comp. Comp. Time From
Charge Velocity
To Impact ft./sec. Velocity ft./sec. 1733 HG 2° 1100 1633 HG 1° 0775 1632 HG 7° 0775 1636 HG 9° 0775 1639 HG 11° 0775 1639 HG 17° 0775 1633 HG 7° 0775 1640 HG 45° Horiz.0775 and 97.2° Wert. Impac: Number 0-29-52

Noso badly deformed.

Nose split open.

Effective Intact - One motor blaw out of carriage aron ignition

Effective Intact

Effective Intact

Effective Intact

Side turn open due to impact with next round.

Effective Intact.

Effective Intact.

Effoctlve Intact,

Condition of Decovered Bomb

Note: * All targets set O" to launcher except last two which were 30° and 45° respectively.

COMPIDENTIAL
DECURITY INPOSM (IION

APPENDIX (A)

0



ROCKET IMPACT RECORD

NAVORD FORM 1882 (Rev. 8-52)

ACTIVITY U. S. Naval Proving G. and Contended the Proving G. activity U. S. Naval Proving G. activity U. S. ac

ESSPENCE: (a	NOL Conf	1tr NP/NOL/X1-1(1258)WA: NCB: gbh	Ser 01811 d	of 9 Oct 19	51		
(6	NPG Repor	Work Request FA-43 of No. 1100	1 0 2eb 132	~ 	IMPACY HUMBER			
TASK ASSIGNMENT NO					40283	=		
EST OBJECT					TEST HUMBER			
Heavy Plate	Test of EX	-200 Mod 3 Electric	Bomb Fuze i	n	T-2b20-	1.5		
250# G.P. B	Somb				10-22-52			
	PLATE TA	RGET DATA		ROCI	KET HEAD			
AUGE	Q.ASS	DIMENSIONS	CALIBER	TYPE	MARK	MOD		
AMUFACTURER	STS	GROUP	250#	G.P. Bomb	AN-M57	HEAD NUMBER		
Carnegie	043792	1						
A ST HOKTO		•	FILLER TYPE	FILLSR WEIGHT	DAPTY WEIGHT	WEIGHT AS FIRED		
	CONCRETE TA		Verm. Cer			241#		
HUMBER GAUGE	DIMENSIONS	DATE POURED	"" #1733		SOOSTERS			
MIXTURE (Per cubic)	(not cenent)		EX-20	0 Mod 3	Inert			
SMID OU. F		CJ. FT. MATER 64L.	1	ROCK	ET MOTOR (3)		
COMPRESSIVE STRENGTH			CALIBER	MARK	MOD	TEMPERATURE		
			5 r 0	10	5	900		
RE INFORCEMENT				COMPLE	TE ROUND			
			MARK	MOO	WEI OIT (As fired	WEIGHT (Burned)		
			OTHER INFORMATI	OH A = = = - 1	1482.30#	1		
				ATM: KWIIA-	153-H-51 153-H-9-51			
	IMPACT	T DATA	ROCKET PERFORMANCE					
OBL I QUITY	PENETRATION		FLIGHT	VELOCITY	***	1086		
00	Comp	lete	20 Yaw	STRIKING		1000		
THICKNESS AT IMPACT		no. or immed on innes!	Complete		LOW ORDE	R MONE		
DISTANCE FROM HEARES	ST IMPACT	DISTANCE FROM HEAR EDGES	DISTANCE OF BUS	ST BEHIND FACE OF TA	ROET			
0		T-42" L-90"						
THROUGH OPENING		CRACKS	CONDITION OF RE		_			
17" X 23-	1/2"	0	Bomb Nos	e badly defo	ormed			
		, vactom, erc./	I					
Dish 3"	Spur 2"		CONDITION OF RE	COVERED HEAD				
Button Th	ırown		EPPECTIVE		INEFFECTIVE			
	im18" x 21							
TAUNCHER USED	THE O TO. A CL							
5001 (1050) Rocket La	uncher						
PHOTOGRAPH NUMBER			i					
NP9-51432	2							
Fuze arms	ed OK and 1	l sec. delay primer f	ired OK					

SIGNATURE		TITLE	
	FW. Kasdorf. W. KASDORF	Ord. Eng.	
P-13000		I	NFIDENTIAL
- 1333	()		
	<u> </u>		

ACTIVITY U. S. Naval Proving Gr nd

CONFIDENTIAL SECURITY IN TRMATION (when the of in Virginia Reference: (a) NOL Conf ltr NP/NOL/X1-1(1258)WA.NCR.obb Son 018

" "REFERENCE:

(a)	MOT (:OUT	10 NP/NOL/X1-1(1250	DIWA:NCB:gbh Ser	01811 of	9 Oct. 1951
(h)	NOT Conf	Work Request FA-43	A B Com TOTA		, 000 4//.
(0)	HOT COIL	LANT TOUR TOUR TOUR	T O Deb TADS		*

	(6)	NPG Repor	rt No. 1108	•		TIMPACY RUMBER				
		NPG-Re2b	-20-1-53			h028h				
TEST OBJECT						TEST NUMBER				
Heavy]	Plate Te	est of EX	-200 Mod 3 Electric I	Somb Fuze in	Ĺ	T-2520-1	.5			
25 0# G.	.P. Bomb	ס	*							
						10-22-52				
		PLATE TA	RGET DATA	ROCKET HEAD						
GAUGE		Q.ASS	DIMENSIONS	CALIBER	TYPE	MARK	MOO			
1M		STS		250#	G.P. Bomb	AN-M57				
		HUMBER	GROUP	MANUFACTURER		LOT MIMBER	HEAD NUMBER			
Carne	egie	043792		FILLER TYPE	FILLER WEIGHT					
		CONCRETE TA	ARGET DATA			EMPTY WELGIT	WEI OIT AS FIRED			
NUMBER	GAUGE	DIMENSIONS	DATE POURED	Verm. Cem	ent	BOOSTERS	246#			
		1	İ	#1035	Mod 2					
MIXTURE (Par	cubic foot	conent)	······································	EX-200 Mod 3 Inert						
SAND		CAAVEL	CU. FT. MATERGAL.		ROCK	ET MOTOR (3)				
COMP. KE 221 AE	STRENGTH (pa	•)		CALIBER	MARK	MOD	TEMPERATURE			
REINFORCEMEN	17			5 0	10	5	900			
				COMPLETE ROUND						
				MARK	M00	WEIGHT (As fired)	WEIGHT (Surned)			
				OTHER INFORMATIO	M A TOT TOOM A	486.35#				
					ALN: RMDA-L	153-H-51				
		1474.07	4.5.	RMDA-453-H-9-51						
		IMPACT	DATA	ROCKET PERFORMANCE						
OC. COULTY		PENETRATION		PL (OIT	AFFOCIA	Mean				
OO THICKNESS AT	IMPACT	[Comp]	ete HO. OF IMPACT ON TARGET	1º Yaw	STRIKING	COIRUM	1129			
1"		}		FUZE PUNCTIONING	EXPLOSIVE ACTION					
	M NEAREST IMP	ACT .	DISTANCE FROM HEAR EDGES	Dud DISTANCE OF BURS	HIGH GEDER	LET ONDER	MONE .			
HOUSH OPEN			T-34" L-54"							
HROUGH OPEN	ING		CAACKS	CONDITION OF RECO	OVERED ROUND					
26" X	32 m	dish, punching,	0							
			batton, etc.)							
Dish h	Spl	ır 2"		CONDITION OF BECO						
Button	Thrown			1_	VERED HEAD					
DUVION	THE OWN			EFFECTIVE		INEFFECTIVE				
Impact	Dim 27	1 X 34"		Nose of bomb split open						
		ket Laund	cher							
TOTOGRAPH NU	500'(1050) Rocket Launcher									
NP9-51	1P9-51433									
Sa		held dow	m by foreign materia	al during ta	rget impact	and fuze th	nerefore			

SIGNATURE			TITLE	
	F.W. Kasdor	F. W. KASDORF	Ord. Eng.	
D-19800			2	CONFIDENTIAL

NAVORD FORM 1882 (Rev. 8-52)

ACTIVITY U. S. Naval Proving C

CONFIDENTIAL SECURITY INFORMATION (When Tilled in) Virgini.

REFE	RENCE	(a

REFERENCE	(b)	NOL Conf ltr NP/NOL/X1-1(1258)WA:NCB:gbh Ser NCL Conf Work Request FA-43 of 8 Sep 1952 NPG Report No. 1108	01811 of	? 9 Oct 195
	~	MIG Mepol o No. 1100		La Maria Maria Cara de

					IMPACT HUMBER			
TASK ASSIGNMENT NO. NPG-Re2b-20-1-53						J10293		
TEST OBJECT					D .			
Heavy Plate 250# G.P. B	Test of EX	-200 Mod 3 Electric	Bomb Fuze in	n	T2b20-1	5		
2,50# G.P. B	OMD				10-23-52			
	PLATE TA	RGET DATA		ROC	KET HEAD			
GAUGE	JLA35	DIMENSIONS	CALIBER	TYPE	MARK	T MOO		
3/4"	STS		250#	G.P. Bomb				
MANUFACTURER	NUMBER	CROUP	MANUFACTURER	Taske Pour	AN-M57	HEAD NUMBER		
					1	8		
	CONCRETE TA	IRGET DATA	FILLER TYPE	FILLER WEIGHT	EMPTY WEIGHT	BEIGHT AS FIRED		
NUMBER GAUGE			Verm. Co	ement		246#		
NUMBER GAUGE	DIMENSIONS	DATE POURED	^{FU. ES} #1531	HG	ROOSTERS			
WIXTURE (Per cabic for	est cenest?		EX-200) Mod 3	Inert.			
		CU. Ft. MAYER GAL.	1	ROCKE	ET MOTOR (3)			
COMPRESSIVE STRENGTH	(901)		CALIBER	MARK	M00	TEMPERATURE		
			5 r 0	10	5	900		
REINFORCEMENT			COMPLETE ROUND					
			MARK	100	WEIGHT (As fired)	I was an all		
						ation (barsed)		
			OTHER INFORMATION ALN: RMDA-453-H-9-51					
					n-453-н-51	1		
	IMPACT	DATA			RFORMANCE			
BLIQUITY	PENETRATION		RIGHT	VELOCITY				
၇၀	Comple	te	15 ⁰ Yaw	STRIKING	Mea	n 855		
THICKNESS AT IMPACT		40. OF IMPACT ON TARGET	FL'AE PUNCTIONING	EXPLOSIVE ACTION				
1 750			Complete	HIGH CHOER	um 0400ER			
DISTANCE FROM NEAREST	i	DISTANCE FROM MEAR EDGES	DISTANCE OF BURE	T BEHIND FACE OF TAR	CÉT			
3311		T-53" L-97"						
	1		CONDITION OF REC	COAFMED MOOND				
16-1/2M TARGET COMBITION (Spe	ill, dish, panching,	butten, etc.)						
	Spur 16							
	- Opin		COMPITION OF REC	DVERED HEAD				
Button I	Thrown		EFFECTIVE		INEFFECTIVE			
					THE PERSON OF TH			
Impact D)im。17" 🗶 2	Ou	Intact					
	(O) D==1=4 =							
HOTOGRAPH MANER	0) Rocket L	auncher	One mot	or blew out	of pusher of	carriage		
NP9-6215	(ব		when ig	nited				
EMARKS								

Fuze armed OK and ll sec. delay primer fired OK

SIGNATURE		TITLE	
- 7 W. Passlery	F. W. KASDORF	Ord, Eng.	
D-:2200		3	CONFIDENTIAL

RMDA-453-H-9-51

ROCKET PERFORMANCE

VELOCITY

NAVORD FORM 1882 (Rev. 8-52) CONFIDENTIAL SECURITY IN ORMATION (when fired in) Virgini

REFERENC	(a) (b) (c)	NOL Conf lt. NOL Conf Wo NPG Report	r NP/NOL/X1-1(12) rk Request FA-43 No. 1108	68)WA:NCB:g of 8 Sep 1	bh Ser 01811 952	of 9 Oct 1	1951
TASK ASS		NPG-Re2b-20				IMPACY HUMBER	
TEST OBJE	СŤ					LO29L	
Heavy 250#	Plate 1 G.P. Bon	Cest of EX-20 mb	0 Mod 3 Electric	Bomb Fuze	in	T2b20=]	5
		A .				10-23-5	2
		PLATE TARGET	DATA		ROC	KET HEAD	
GAUGE		CLASS	DIMENSIONS	CALIBER	TYPE	MARK	M00
MANUFACTUR	Tu	STS		250#	G.P. Bomb	AN-M57	
MANUFACTUR	TEN	NUMBER	GROUP	MANUFACTURER		LOT NUMBER	HEAD NUMBER
				FILLER TYPE			4
		CONCRETE TARGE	T DATA	Verm. C	ement	EMPTY WEIGHT	WEIGHT AS FIRED
NUMBER	GAUGE	DIMENSIONS	DATE POURED	PUZES #16	32 HG	BOOSTERS	
MIXTURE /P	er cubic foot	100000			200 Mod 3	Inert	
SAND	QJ. FT.	GRAVEL CU	. FT. WATERGAL.		ROCK	ET MOTOR (3)	***
COMPRESSIV	E STRENGTH (P	#i)		CALIBER	MARK	MOD	TEMPERATURE
REINFORCEM	ENT		· · · · · · · · · · · · · · · · · · ·	510	10	5	900
					COMPLE	TE ROUND	
ī				MARK	MOD	WEIGHT (As fired	() WEIGHT (Burned)
				OTHER INFORMA	TION	487.15#	
				11	ATN-PMDA	_),ば3_¤_ば1	

00	Complete	70 Yaw STRIKING	Mean	1096
THICKNESS AT IMPACT	NO. OF IMPACT ON TARGET	FUZE FUNCTIONING EXPLOSIV	E ACTION	
. 750		Complete	ORDER LOW ORDER	HONE
DISTANCE FROM NEAREST IMP	ACT DISTANCE FROM NEAR EDGES	DISTANCE OF BURST BEHIND F	ACE OF TARGET	
23"	T-48" L-143"			
THROUGH OPENING	CRACKS	CONDITION OF RECOVERED ROU	ND	
12" X 18"	0	1		
TARGET COMDITION (Spall,	fish, panching, button, ste.)			••
Dish L' Sp	ur 5#			
		CONDITION OF RECOVERED HEAD		
Button Thro	in	EFFECTIVE	INEFFECTI VE	
Impact Dim.	13m X 22m	Intact		
LAUNCHER USED				
500'(1050 R	ocket Launcher	4		
PHOTOGRAPH NUMBER				

Fuze armed OK and ll sec. delay primer fired OK

IMPACT DATA

OBLIQUITY

NP9-62152

SIGNATURE		TITLE	
F.W. Kasslory	F. W. KASDORF	Ord. Eng.	
D-12200	4		CONFIDENTIAL

NAVORD FORM 1882 (Rev. 8-52) CONFIDENTIAL SECURITY IN JRAATION (When iffed in) ACTIVITY U. S. Naval Proving Grand Dahlgren, Virginia

(b) NOL Conf ltr NP/NOL/XI: (b) NOL Conf Work Request 1 (c) NPG Report No. 1108	FA-43 of	8 Sep 195	2		
TASK ASSIGNMENT NO. NPG-Re2b-20-1-53				IMPACY HUMBER	
TEST OBJECT	———			LO303	
Heavy Plate Test of EX-200 Electric	Bomb Fu	ze in		T2b20-1	
250# G.P. Bomb	20110 1 4	20 211		T2b20-1	
				10-28-52	
FLATE TARGET DATA			ROC	KET HEAD	
GAUGE CLASS DIMENSIONS		CALIBER	TYPE	MARK	MOD
	X 220m	250# G.	P. Bomb	AN-M57	
MANUFACTURER NUMBER GROUP		MANUFACTURER		LOT HUMBER	HEAD NUMBER
		FILLER TYPE	FILLER WEIGHT	EMPTY WEIGHT	WEIGHT AS FIRED
CONCRETE TARGET DATA		Cement	j		#بليا2
NUMBER GAUGE DIMENSIONS DATE POURED	D	^{NZES} #1636	HG	BOOSTERS	
			0 Mod 3	Inert	
MIXTURE (Per cubic foot coment) AND CU. FT. GRAVEL CU. FT. WATER	ca .		ROCK	ET MOTOR (3)	
COMPRESSIVE STRENGTH (poi)		CALIBER	MARK	MOD	TEMPERATURE
		5.0	10	5	900
REINFORCEMENT			COMPLE	TE ROUND Wt.	80.15#
		MARK	MOD	WEIGHT (As fired,	WEIGHT (Burned)
		OTHER INFORMATIO		484.45#	1
		ALN:RMD	A-453-H-9-5	1	
IMPACT DATA			ROCKET P	ERFORMANCE	
BLIQUITY PENETRATION		FLIGHT	VELOCITY	Mea	n 1072
O Complete HICKNESS AT IMPACT IN TARGET NO. OF IMPACT ON TARGET		90 Yaw	STRIKING	mesious	<u>n 1072</u>
1750			HIGH ORDER	LOW ORDER	X HONE
STOU DISTANCE FROM NEAREST IMPACT DISTANCE FROM NEAR EDGES	S	Armed DISTANCE OF BURS	T BEHIND FACE OF TA		(AL) Have
3811 T-568 R-111111					
		CONDITION OF REC	OVERED ROUND		
10W X 29-1/2W 0 (ARGET CONDITION (Spall, dish, punching, button, etc.)		ļ			
Dish 3" Spur L"		CONDITION OF REC	DVERED HEAD		
Button Thrown		EFFECTIVE		INEFFECTIVE	
Impact Dim. 12" X 31"		Intact			
1050! Rocket Launcher •		-			
NP9-62154					
AFMA ON O					

SIGNATURE	TITLE	
FW. Kasslorf	F. W. KASDORF ord.	Eng.
D-12209	3	CONFIDENTIAL

CONFIDENTIAL SECURITY IN JRAATION (Which The Bith) Virgini

REFERENCE:	(a)	NOL C	onf Ltr	NP/NOL/	(1-1(125	8)WA: NCF	gbh Ser	01811	of	9 00	t 195	1
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NPG Report No. 1108 MPACY NUMBER TASK ASSIGNMENT NO. NPG-Re2b-20-1-53 70307 TEST OBJECT T2b20-Heavy Plate Test of EX-200 Electric Bomb Fuze in 250# G.P. Bomb 10-28-52 PLATE TARGET DATA ROCKET HEAD CLASS GALIGE DIMENSIONS CALIBER TYPE MARK 3/4" 105" X 220" STS AN-M57A-1 250# G.P. Bomb MANUFACTURER MANUFACTURER HEAD MIMBER WELGHT AS FIRED FILLER TYPE FILLER WELCHT EMPTY WEIGHT CONCRETE TARGET DATA 2111# Cement DIMENSIONS DATE POURED GAUGE BOOSTERS #1630 HG EX-200 Mod 3 Inert MIXTURE (Per cubic foot cement) ROCKET MOTOR (3)_ QJ. FT. GRAVEL_ MATER_ CU. FT. GAL COMPRESSIVE STRENGTH (psi) CALIBER TEMPERATURE 5**r**0 10 900 REINFORCEMENT COMPLETE ROUND MOD WEI GIT (As fired) WEIGHT (Burned) OTHER INFORMATION <u> ALN:RMDA-453-H-9-51</u> ROCKET PERFORMANCE IMPACT DATA PENETRATION OBLIQUITY FL I GHT VELOCITY Mean 1074 00 110 Yaw Complete STRIKING. THICKNESS AT IMPACT NO. OF IMPACT ON TARGET EXPLOSIVE ACTION FUZE FUNCTIONING X NONE **\$750** HIGH ORDER Armed LOW ORDER DISTANCE FROM NEAR EDGES DISTANCE FROM NEAREST IMPACT DISTANCE OF BURST BEHIND FACE OF TARGET T-56" R-63" CONDITION OF RECOVERED ROUND THROUGH OPENING 128 X 318 m Dish 4" Spur 23" CONDITION OF RECOVERED HEAD Button Thrown EFFECTIVE INEFFECTIVE Intact Impact Dim. 14" X 34" 1050' Rocket Launcher NP9-62155

Fuze armed but 11 sec. primer did not fire

SIGNATURE	11 /		TITLE	
FW.	Kasdorf	F. W. KASDORF	Ord. Eng.	
0-12299	1		6	CONFIDENTIAL

CONFIDENTIAL SECURITY IN. ORMATION (Whom Pablaten h) Virgin

2000000	1.1	MOT	000

of 1+m NP/NOI/Y1_1/1258\WA.NCB. obb Ser 01811 of 0 0c+ 1051

REFERENCE	(b) (§)	NOL Conf NPG Repo	Work R	7NOL/AI-1(1250 equest F A-43 0	of 8 Sep 19	52	01 9 000 1	371
		NPG-Re2b-					IMPACT NUMBER	
TEST ON ECT		MPG-MG20-	20-1-))				40305	
Heavy	Plate T	est of EX	-200 El	ectric Bomb Fu	ze in		T2b20-1	
	P. Bom						8	
							10-28-5	2
		PLATE TA	ARGET DATA			ROC	KET HEAD	
AUGE		CLASS		DIMENSIONS	CALIBER	TYPE	MARK	MOO
3/)LM	t ER	STS NUMBER		105" X 220"	250#	G.P. Bomb	AN-M57A-	HEAD NUMBER
					FILLER TYPE			
		CONCRETE T	ARGET DAT	A	1)	FILLER WEIGHT	EMPTY WEIGHT	WEIGHT AS FIRED
ILMBER	GAUGE	DIMENSIONS		DATE POURED	Cement #163	6 нс 	BOOSTERS	2)111#
						00 Mod 3	Inert	
AIXTURE (Pa	CU. FT.	GRAYEL	QJ. FT.	WATERGAL.		ROCK	ET MOTOR (3)
	STRENGTH (PE				CALIBER	MARK	MOD	TEMPERATURE
EINFORCEME					580	10	5	900
CINTURCENC						COMPLE	TE ROUND W	t. 80.00#
					MARK	MOD	WEIGHT (As fires) WEIGHT (Burned)
					OTHER INFORMATI	ON	1181100#	
						AIN:RMDA-	153 <u>-</u> H-9-51	
		IMPACT	T DATA				ERFORMANCE	
BLIQUITY		PENETRATION			FLIGHT	VELOCITY		
00		Co	mplete		17° Yaw	STRIKING	Mea Mesicu	<u>1098</u>
HICKNESS A			NO. OF IMPAC	T ON TARGET	FUZE FUNCTIONIN			- FR
STANCE FR	OM NEAREST IM	PACT	DISTANCE FRO	M NEAR EDGES	DISTANCE OF SUR	HIGH ORDER	RGET LOW ORDE	R X NONE
50)#		T=4911	R-113"				
HROUGH OPE			i		CONDITION OF RE	COVERED ROUND		
ARGET COND	TTON (Spall,	dish, punching,	button, etc.	,	 			
Di	sh Ln	Spur 38"			1			
		•			CONDITION OF RE	OVERED HEAD		
Bu	tton Th	COWD			EFFECTIVE		INEFFECTIVE	
Im	mact Dir	n. 19" X	<u> </u>		Side tom	n open by si	occeeding r	ound in sand
AUNCHER US	ED				butt		A STATE OF THE STA	
10		cet Launc	her		-			
NP	9 <u>-</u> 62156							
EMARKS								
Fu	ze armed	d but 11	sec. pri	imer did not f	ire			

SIGNATURE		TITLE	
FW. Kosdord	F. W. KASDORF	Ord. Eng.	
D-12280		7	CONFIDENTIAL

ROCKET IMPACT RECORD

ACTIVITY U. S. Naval Proving Grand

NAVORD FORM 1882 (Rev.	8-52)	Deblemen Vinginia	
CONFIDENTIAL	CECT INITY	INTERMATION (When Planting Pin) Virginia	

(a) NOL Conf ltr NP/NOL/X1-1(1258)WA: NCB: gbh Ser O1811 (b) NOL Conf Work Request FA-43 of 8 Sep 1952 (c) NPG Report No. 1108							
SK ASSIGNMENT NO. NPG-Re 2b-20-1-53					LO308		
avy Plate T	est of EX-20	O Electric Bomb Fu	ze in		T2b20-1		
O# G.P. Bom	ıb				10-29-52		
	PLATE TARGE	T DATA	ROCKET HEAD				
		DIMENSIONS	CALIBER	TYPE	MARK	MOD	
IGE	CLASS	105" X 220"		.P. Bomb	AN-M57		
3/L11	STS NUMBER	GROUP	MANUFACTURER		LOT NUMBER	HEAD NUMBER	
					EMPTY WEIGHT	7	
	CONCRETE TARGE	T DAT		FILLER WEIGHT	Zari velon	21:8#	
	CONCRETE TARGE		Cement	•••	(BO)STERS	21:0#	
MBER GAUGE	DIMENSIONS	DATE POURED	FUZES #1633	Mod 3	Inert		
XTURE (Per cubic foo	t const)		EA-200				
	GRAVEL	CU. FT. WATERGAL.		ROCK	ET MOTOR (3		
MPRESSIVE STRENGTH (CALIBER	MARK	MOD	TEMPERATURE	
			580	10		900	
INFORCEMENT				COMPLE	TE ROUND W	t. 80.15#	
			MARK	MOD	WEIGHT (As fire		
					1.88.1.5#		
			OTHER INFORMATION		מיז לו		
			A	IN: RMDA-45			
IMPACT DATA			ROCKET PERFORMANCE				
BL I QUI TY	PENETRATION		FL I GHT	VELOCITY STRIKING		an 1090	
00	Complet		70 Yaw	EXPLOSIVE ACTION			
HICKNESS AT IMPACT	""	. OF IMPACT ON TARGET	Armed	HIGH ORDER	Low one	X NON	
8750 ISTANCE FROM HEAREST	IMPACT GI	STANCE FROM NEAR EDGES	DISTANCE OF BURS	T BEHIND FACE OF T	ARGÉT		
49		Т-444 L-564					
HROUGH OPENING	CF	ACKS	CONDITION OF RECOVERED ROUND				
13-1/2"]	1911 ill, dish, punching, bi	0					
		itten, etc.)	1				
Dish 4	Spur 7"		CONDITION OF RE	COVERED HEAD		-	
Dutter Throim			EFFECTIVE		INEFFECTIVE		
Button Thrown							
	lm。 15" X 22"		Intact	, 			
LAUNCHER USED	-lank Tanuahan		ı				
1050 ROC	cket Launcher						
NP9-6215	7						
REMARKS							

F. W. KASDORF Ord. Eng.

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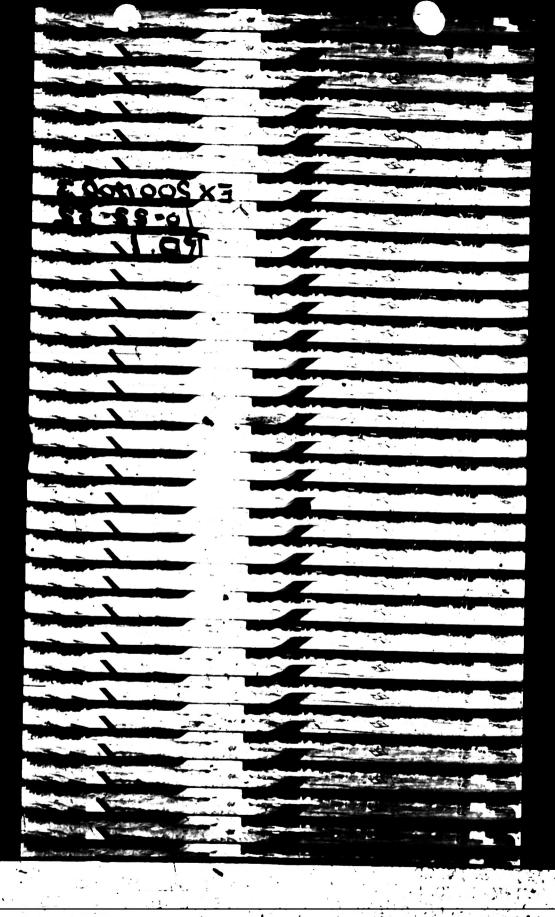
ACTIVITY U. S. Naval Proving Ground
ORMATION (When Tilled in) Virgini ROCKET IMPACT RECORD
NAVORD FORM 1882 (Rev. 8-52)

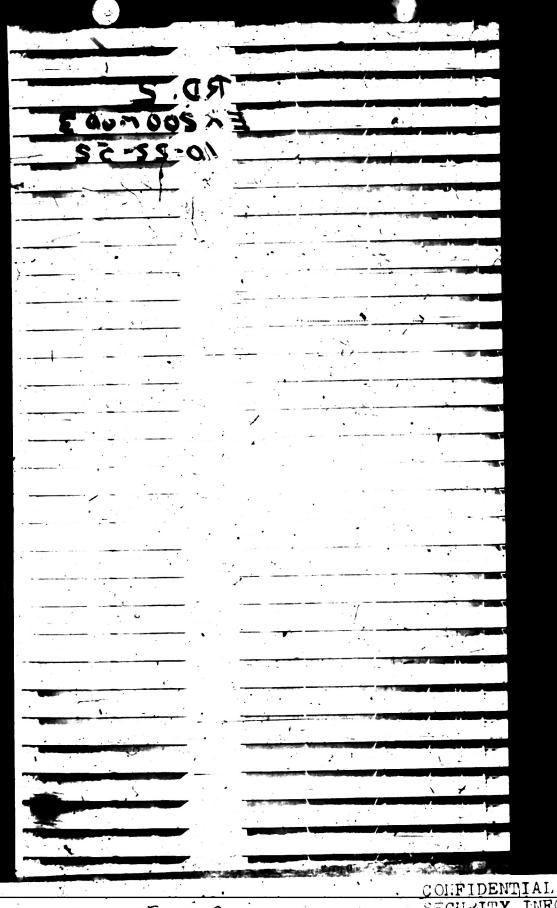
ONFIDENTIAL SECURITY INFORMATION (When Times in Figure 1997) FERENCE: (a) NOL Conf ltr NP/NOL/X1-1(1258)WA: NCB: gbh Ser 01811 (b) NOL Conf Work Request FA-43 of 8 Sep 1952 (b) NPG Report No. 1108 SK ASSIGNMENT NO. NPG-Re2b-20-1-53				40309		
OSUECT	Test of EX-20	00 Electric Bomb Fu	TEST NUMBER			
	PLATE TARGE	T DATA	ROCKET HEAD			
ĢE	CLASS	DIMENSIONS	CALIBER	TYPE	MARK	MOD
3/LH	STS NUMBER	105" X 220"	250# MANUFACTURER	G.P. Bomb	AN-M57	HEAD NUMBER
	CONCRETE TARG	ET DATA	Cement	FILLER WEIGHT	EMPTY WEIGHT	245#
BER GAUGE	DIMENSIONS	DATE POURED	FUZES #171	HG Mod 3	moosters Inert	
XTURE (Per cubic foot cement)					KET MOTOR (3)	
PRESSIVE STRENGT		CU. FT. WATERGAL.	CALIBER	MARK	MOD	TEMPERATURE 900
NFORCEMENT			590	10	ETE ROUND WE	***************************************
			MARK	M00	WEIGHT (As fire	80.25#
			OTHER INFORMAT	ALN': RMD	485.75# -453-H-51 PERFORMANCE	
IMPACT DATA			FLIGHT	VELOCITY		an 2001
30 ⁰	Comp	olete	50 Yaw	STRIKING		an 108L
1750		DISTANCE FROM NEAR EDGES	Armed	HIGH ORDER	TARGÉT	ER X HONE
STANCE FROM NEAR	[31 1,001	T-53" L-77"	CONDITION OF	RECOVERED ROUND		-
	1-1/2 ^M Spall, dish, punching,	O batton, etc.)	_			
Dish L* Spur 9* Button Thrown			CONDITION OF	RECOVERED HEAD	INEFFECTIVE	
Impact Dim. 14" X 27"			Intact			
AUNCHER USED 10501 R	ocket Launche					
np9-62]						
FMARKS		ec. primer did net i	fire			
SIGNATURE 13	, , ,		TITLE			
= W Pa	dord	F. W. KASDORI	F Ord. E	ng.		CONFIDEN"

ACTIVITY U. S. Naval Proving Granund

ONFIDENTIAL SECURITY IN ORMATION (where the feating) in grant is a confidence of the NP/NOL/X1-1(1258)WA: NCB: gbh Ser Oldli (b) NOL Conf Work Request FA-43 of 8 Sep 1952 (c) NPG Report No. 1108					10			
	SK ASSIGNMENT NO. NPG-Re2b-20-1-53					T2b20=1		
eavy Plate Test of EX-200 Electric Bomb Fuz				ze in				
50# G.P.	50# G.P. Bomb				10-29-52			
	PLATE	TARGET	DATA	ROCKET HEAD				
AUGE	CLASS		DIMENSIONS	CALIBER	TYPE	MARK	MOD	
3/L#	\	STS	105" X 220"		P. Bomb	AN-M57	HEAD NUMBER	
ANUFACTURER	NUMBER		GROUP	MANUFACTURER		LO! NOMBER	5	
	CONCRET	E TARGET	DATA	FILLER TYPE	FILLER WEIGHT	EMPTY WEIGHT	WEIGHT AS FIRED	
			DATE POURED	Cement #1640	NC .	BOOSTERS	24.7#	
ILMBER G	AUGE DIMENSI	JM 3			0 Mod 3	Inert		
MIXTURE (Per ce	bic foot coment)					KET MOTOR (3)		
COMPRESSIVE ST	CU. FT. GRAVEL	cv.	FT. MATERGAL.	CALIBER	MARK	MOD	TEMPERATURE	
COMPRESSIVE 311				5 to	10	5	900	
REINFORCEMENT					COMPLETE ROUND			
				MARK	MOD	WEIGHT (As fired	WEIGHT (Burned)	
				OTHER INFORMATIO	<u></u>	L86.20#		
				OTHER THPOMPATIC	⊶ Aln:rmda-4	53-H-51		
	IMPACT DATA			ROCKET PERFORMANCE				
OBLIQUITY	PENETRA	TION		FLIGHT	VELOCITY	Me	an 1094	
450		Comp	ete	9-1/20 YE	STRIKING	N RESTRE		
THICKNESS AT I		No. C	OF IMPACT ON TARGET	Complete		LOW ORDE	ER HONE	
#750	NEAREST IMPACT	DISTA	INCE FROM NEAR EDGES	DISTANCE OF BUR	ST BEHIND FACE OF	TARGÉT		
57"		T.	-53" L-13L"	CONDITION OF RE	ECOVERED ROUND			
THROUGH OPENIE		l						
TARSET CONDIT	X 28M on (Spell, disk, pa	nching, butt	on, etc.)		-			
Dish	4" Spur	13"			CONTRED MEAD			
			CONDITION OF RECOVERED HEAD INEFFECTIVE					
Button Thrown			Intact					
Imp	Impact Dim 26" X 31"			Int	ac v			
105	Procket L	auncher		_				
	PHOTOGRAPH NUMBER NP9-62160							
REMARKS								
_	e ammod OK	and 11	sec. delay primer	fired OK				

CONFIDENTIAL





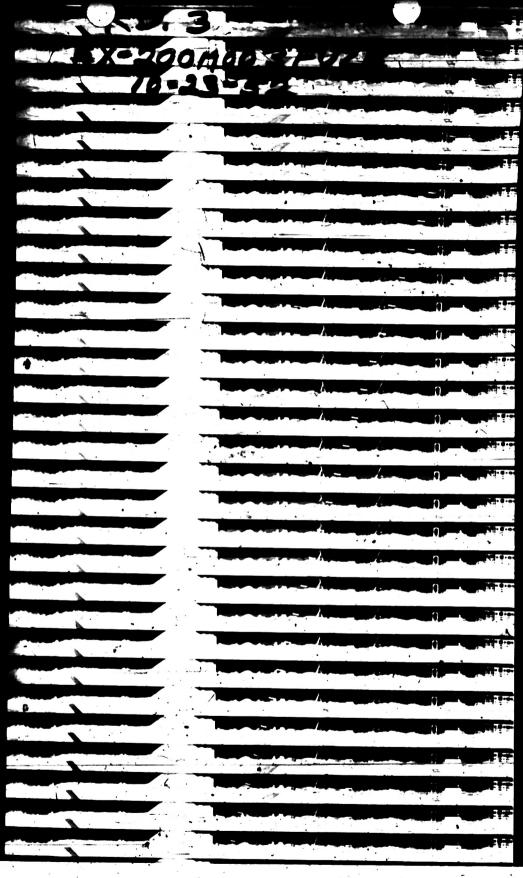
NP9 51433

Figure, 2

Heavy plate impact test of EX 200 Mod 3 Electric Bomb Fuze. Fired

from NPG 500 ft. launcher at 1129 ft./sec. in 250 lb.G.P. Bomb.

Target: 1:0 STS plate at 0 obliquity. Date Fired: 22 October 1952.



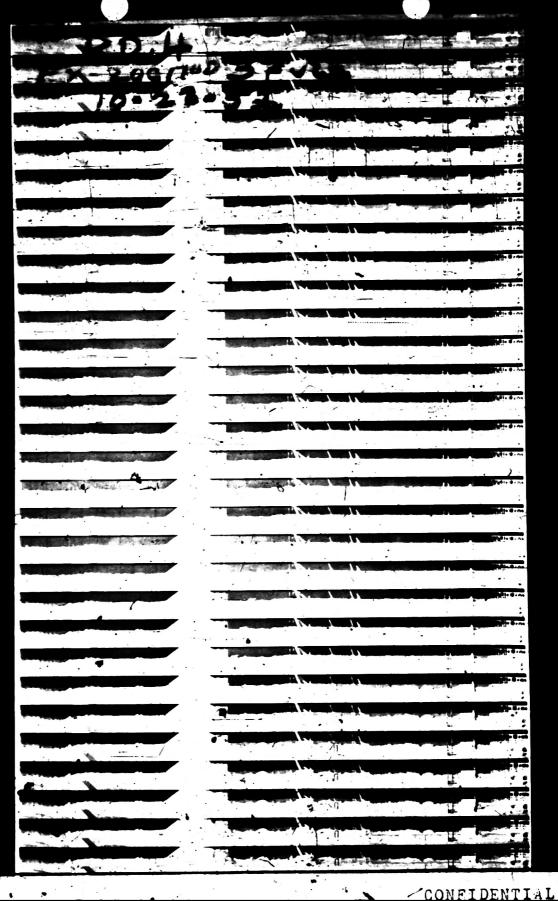
CONFIDENTIAL

73 October 1952

SECURITY INFORMATION
bomb fuze. Fired from NPG 500 ft. launcher at 855 ft/sec. in
of the carriage at ignition resulting in low velocity.

Target: 0.75 STS plate at 0 obliquity.

Pigure 3



NP9-62152

23 October 1952

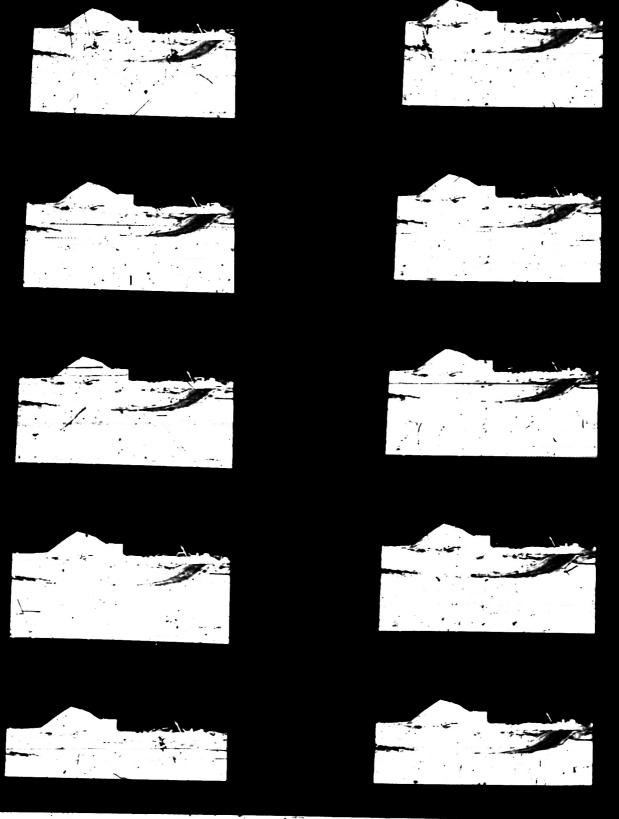
SECURITY INFORMATION

Impact No. 40294 - Heavy plate impact test of EX 200 Mod 3 electric

bomb fuze. Fired from NPG 500 ft. launcher at 1096 ft/sec. in

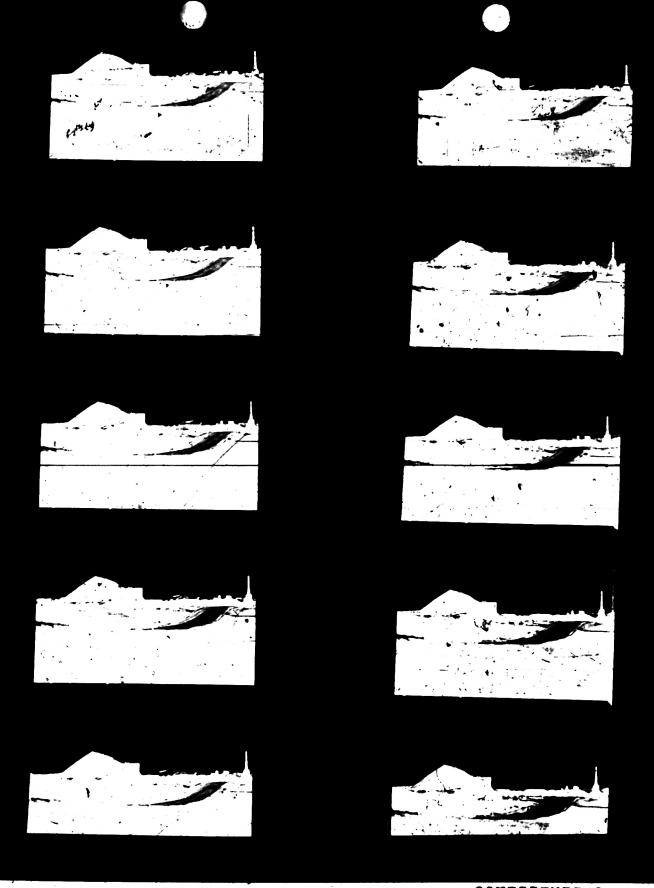
250 lb. G.P. Bomb. Target: 0075 STS plate at 0° obliquity.

Figure 4



NP9-62154

Impact No. 40303 - Heavy plate impact test of EX-200 Mod 3 electric bomb fuze. Fired from NPG 500 ft. launcher at 1072 ft/sec. in 1250 lb. G.P. Bomb. Target: 0775 St3 lane at 0 obliquity.



NP9-62155

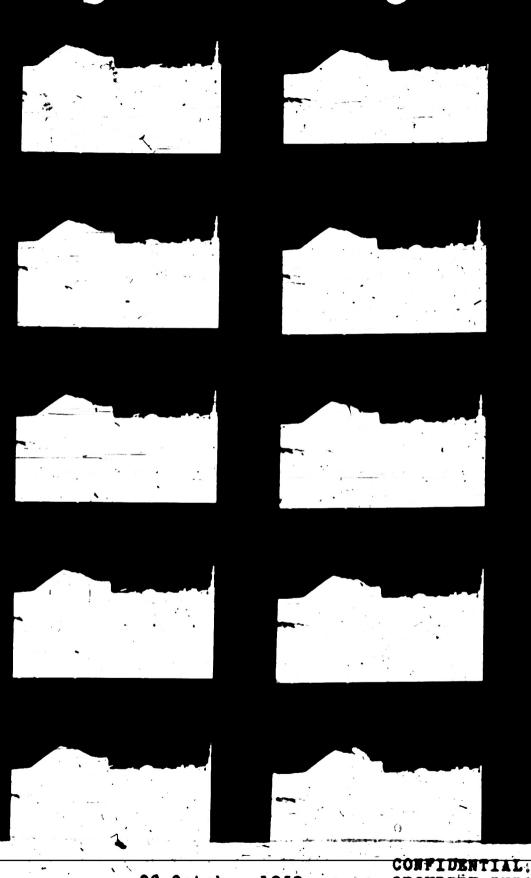
28 October 1952

SECURITY INFORMATION

Impact No. 40304 - Heavy plate impact test of EX 200 Mod 3 electric

bomb fuze. Fired from NPG 500 ft. launcher at 1074 ft/sec. in

250 lb. G.P. Bomb. Target: 0775 STS plate at 0 obliquity.

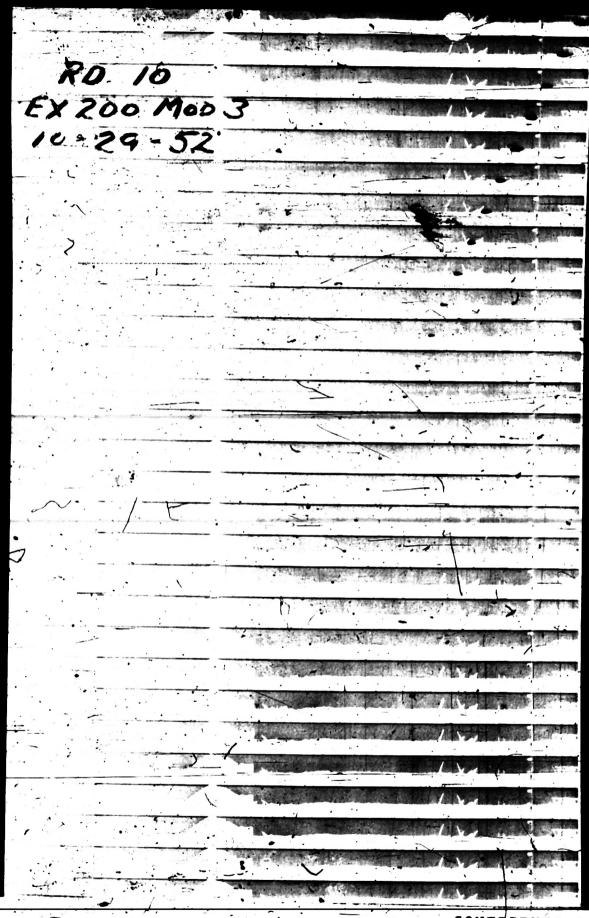




Impact No. 40702 - Peavy plate impact test of EX 200 Mod 3 electric bomb fuze. Fired from NPG 500 ft. launcher at 1090 ft/sec. in 250 lb. G.P. Bomb. Target: 0.75 STS plate at 0. obliquity.



Impact 1. 40009 - Heavy plate impact test of XX 200 Yod 3 electric post 10.0 Pomb. Target 0.75 STo late at 30 obliquity.



NP.9-62160

Impact No. 40310 - Heavy plate impact test of FX 200 Mod 3 electric bomb fuze. Fired from NPG 500 ft. launcher at 1094 ft/sec. in 250 lb, G.P. Bomb. Target: 0775 STS plate

Rocket Launcher Tests of Electric Bomb Fuze EM-200 Mod 3

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Rocket Launcher Tests of Electric Bomb Puze EX-200 Mod 3

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